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A6D D23B

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(54) Improvement for a golf club

(57) A golf club comprising a shaft and a head joined together by embedding a male part 6 in a female part or insertion hole, the two being made of composite material or plastics, characterised in that an intermediate metal ring 10 is located between the inner peripheral surface of the female part or insertion hole and the outer peripheral surface of the male part and projects beyond the insertion hole by a distance l and may be covered by a member 15.

FIG 1

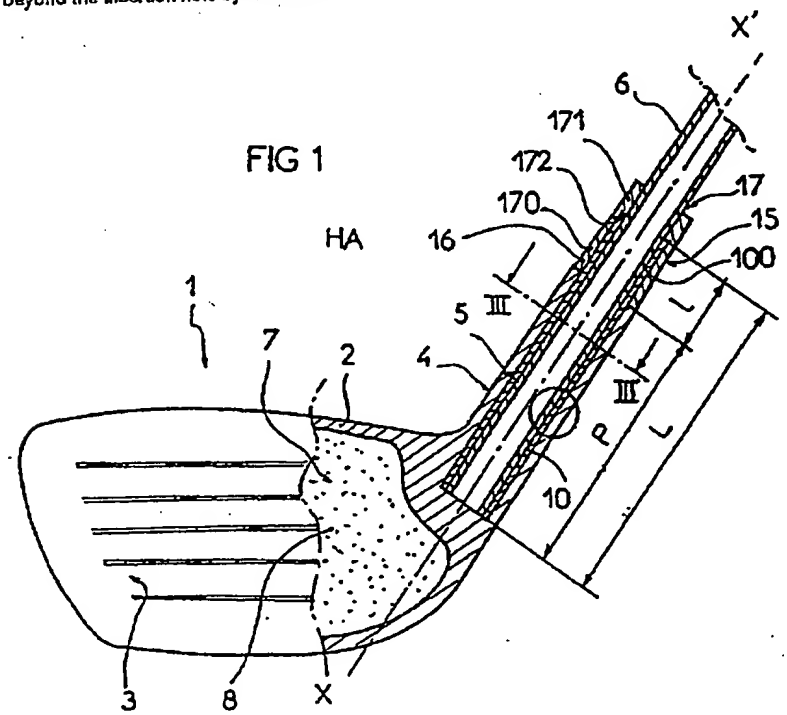

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FIG 1

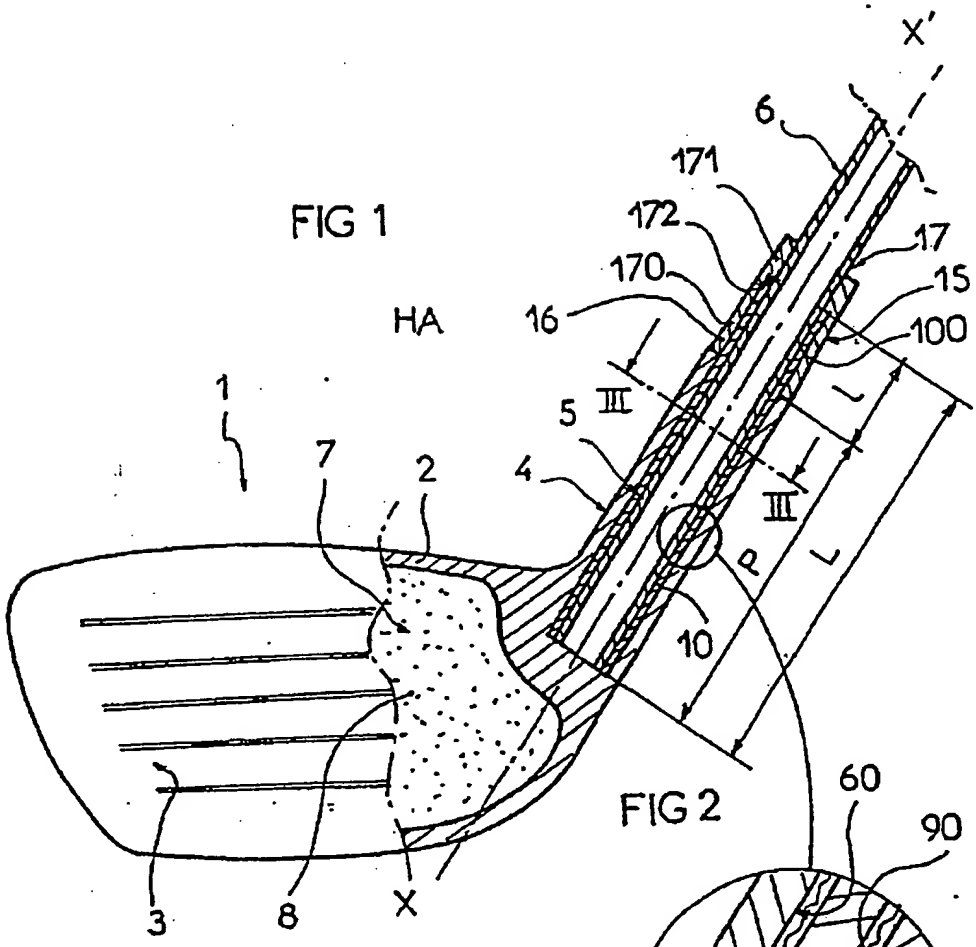


FIG 2

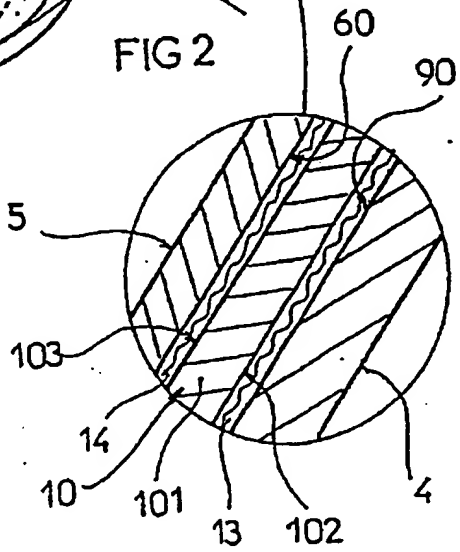


FIG 3

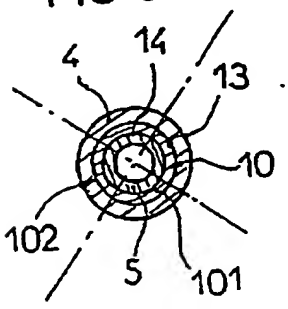


FIG 4

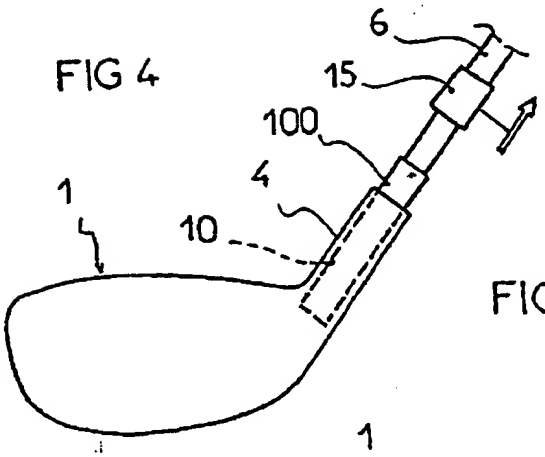


FIG 5

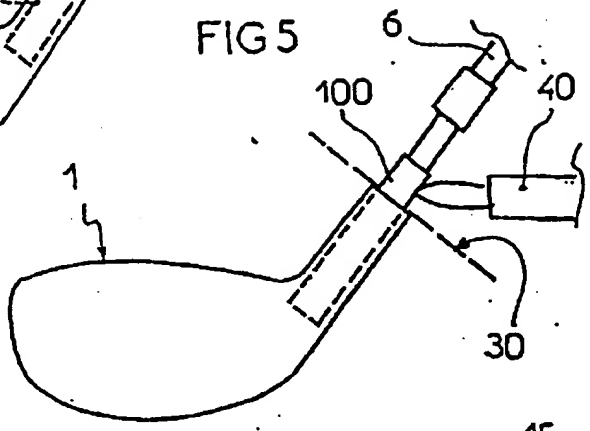


FIG 6

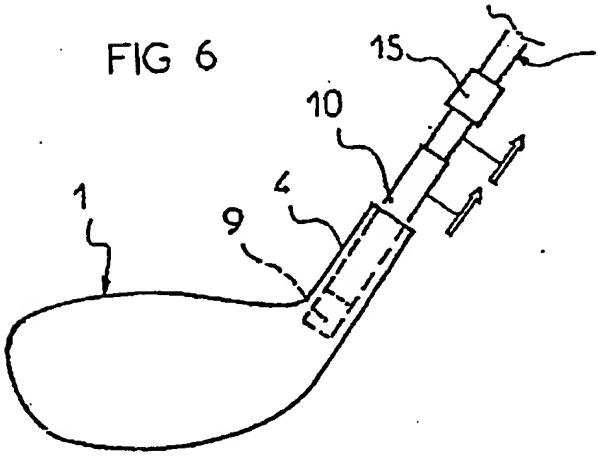


FIG 7

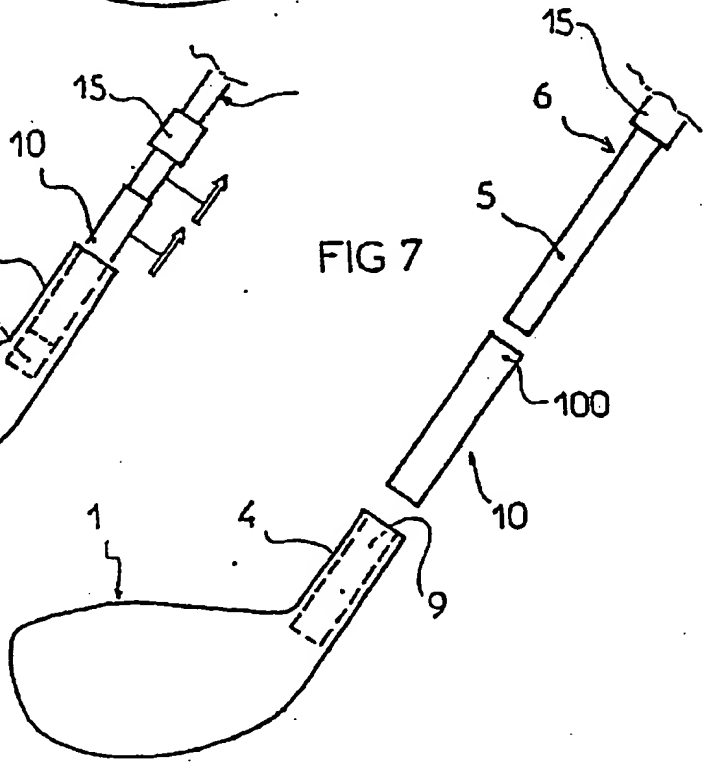


FIG 8

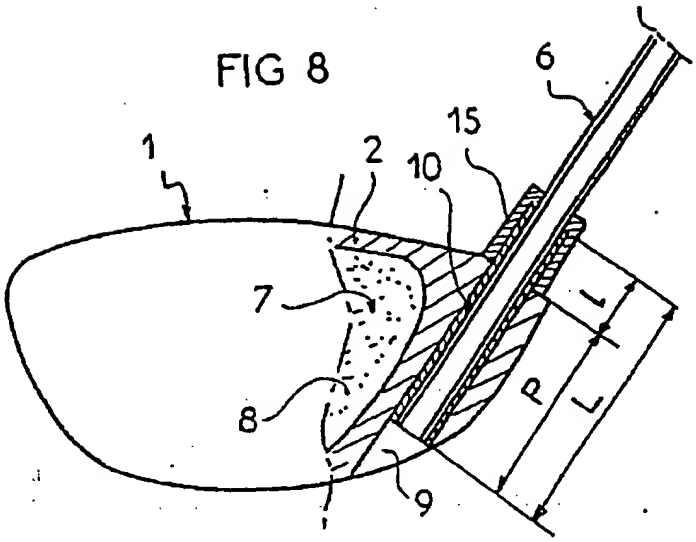


FIG 12

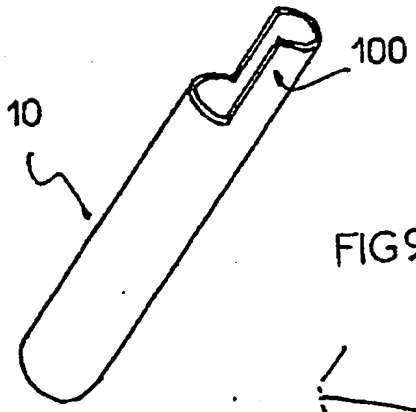


FIG9

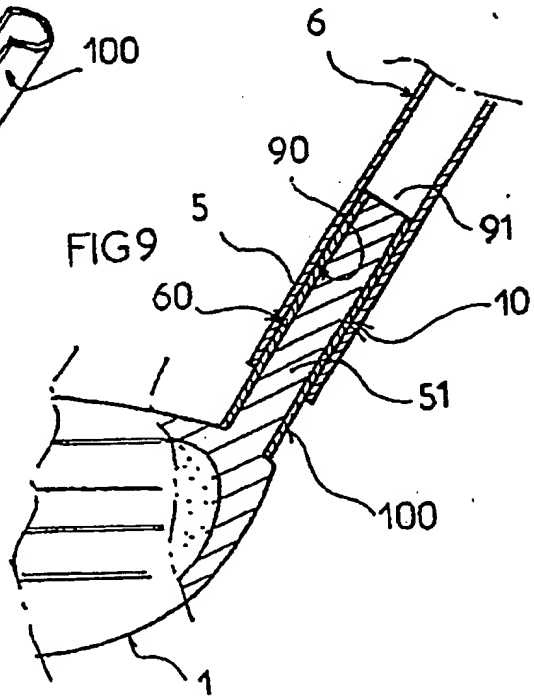


FIG 10

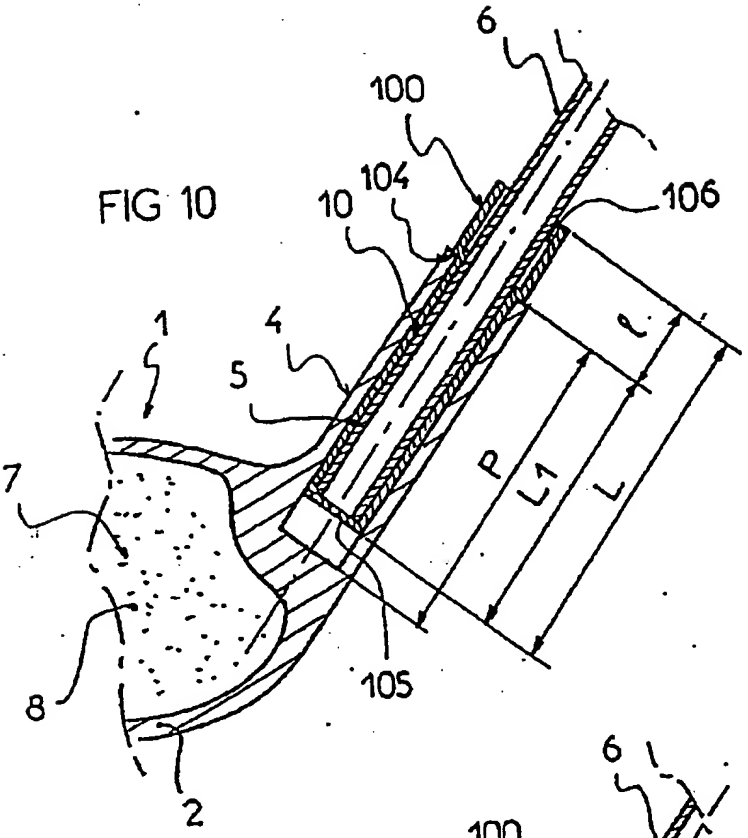
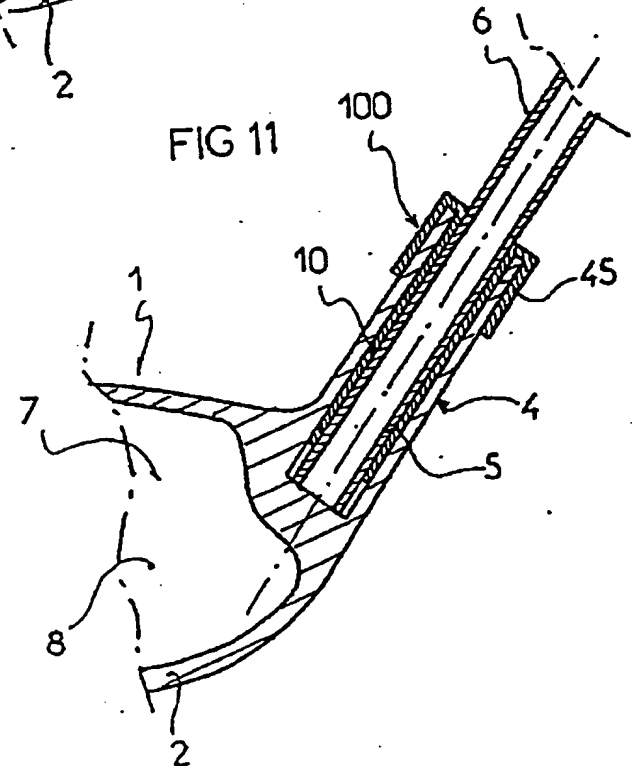


FIG 11



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IMPROVEMENT FOR A GOLF CLUB

This invention relates to a golf club and more specifically to an improvement in assembling the head on the shaft. The invention also relates to a method whereby the shaft can be released.

When playing the game of golf the player strikes his ball to move it, propelling it with a tool called a golf club, which consists of a shaft bearing a head at its lower end while its upper end is equipped with a handle known as a grip.

In a known way the head proper is extended laterally by a neck which is designed to receive the shaft. For this purpose the neck includes a hole into which the lower end of the shaft is bonded using epoxy-type adhesive.

It often happens that a player wishes to change the shaft of his club, either because it has been damaged, or because it is not entirely suitable for his game. In fact hitting accuracy depends on a number of parameters, in particular the parameter relating to the stiffness of the shaft and/or its structure. A player will thus wish to be able to change the shaft or have it changed. This operation does not give rise to many problems and is quite easy in the case of clubs where both the head and the shaft are of metal, as all that is necessary is to heat

the club locally where the shaft is inserted, which softens or destroys the adhesive, and makes it possible for the shaft to be drawn free.

This operation is unfortunately not possible in the case of clubs where the connecting part cannot be heated. This applies to clubs where the head is constructed of plastics or composite material, at least in the area where the shaft is inserted, and in which the shaft is not of steel, but e.g. of a composite material. It will easily be understood that heating the part in which the shaft is inserted would cause irremediable deterioration of the head and of the shaft, which could then no longer be used.

The object of this invention is therefore to overcome this disadvantage and to provide a new arrangement for the shaft/head assembly which allows it to be dismantled many times without damage to the parts.

According to the invention there is provided a golf club having a shaft connected to a head by a joint comprising a male part inserted in a female socket, both male part and socket being defined by composite material or plastics, and an intermediate metal ring interposed between the inner peripheral surface of the socket and the outer peripheral surface of the male part and projecting from the socket.

In accordance with one embodiment the male part consists of the lower end of the shaft, and the female socket is an insertion hole provided in the head, e.g. in a neck forming part of the head.

In accordance with another embodiment the male part is integral with the head, and the female socket comprises an insertion hole defined in the lower end

of the shaft.

In accordance with a preferred embodiment the invention provides a golf club having a head, a shaft of plastics or composite material with the lower part engaged in an insertion hole formed in the region where the shaft is joined to the head, and an intermediate metal ring interposed between the outer peripheral surface of the lower part of the shaft and the inner peripheral surface of the insertion hole and projecting out of the insertion hole.

In accordance with other features the intermediate ring includes a peripheral wall which comprises an inner peripheral surface which is bonded to the outer peripheral surface of the lower part of the shaft by means of a first layer of adhesive and an outer peripheral surface bonded to the inner peripheral surface of the insertion hole by a second layer of adhesive. The said intermediate ring is of e.g. aluminium or steel, and is thin.

In accordance with a particular embodiment the upper part of the intermediate ring projecting outside the insertion hole is annular or partly annular, and it may be covered by a covering ring of e.g. plastics material.

The invention also relates to the method for removing the shaft from the golf club which comprises the steps of heating the part of the intermediate ring which projects above the insertion hole in order to soften or destroy adhesive fixing the intermediate ring in place, heat being transmitted along the intermediate ring by thermal conduction, and withdrawing the shaft.

Other features and advantages of the invention will become apparent from the following description which relates to the appended drawings which are merely given by way of non- restrictive examples. The figures

illustrating the invention only illustrate the lower part of the club, the upper part of the shaft incorporating the grip being in itself well known.

Figure 1 is an illustration of the lower part of one embodiment of a club according to the invention, in a partial cross-section along a diametral plane of the shaft.

Figure 2 is a view on a magnified scale showing the invention in more detail.

Figure 3 is a view in transverse cross-section along III-III in Figure 1.

Figure 4 to 7 illustrate the dismantling procedure according to the invention.

Figure 4 shows the preliminary stage.

Figure 5 shows the stage involving softening of the adhesive.

Figure 6 shows the dismantling stage proper.

Figure 7 shows the club once dismantled.

Figures 8 and 9 are views similar to Figure 1 illustrating a variant embodiment.

Figures 10 and 11 are partial views similar to Figure 1 showing two other embodiments.

Figure 12 is a perspective view of a variant embodiment of theintermediate ring.

The club head (1) illustrated in the figures is of the type called a "wood" and includes e.g. a shell (2) incorporating a striking face (3) and is extended laterally and upwards by a neck (4) designed to receive the lower end (5) of shaft (6) of the club.

The head is e.g. constructed of an envelope of composite material or plastics in order to form an internal cavity (7) which is advantageously filled with a foam (8) such as e.g. polyurethane foam. The neck (4) comprises an upwardly extending lateral extension (EA) and incorporates an insertion hole (9) of axis (XX') which is

closed off at its lower end and open at the top in order to allow the lower end (5) of the shaft, which is in the form of a cylindrical tube constructed of composite material, to be inserted therein.

In accordance with the invention an intermediate ring (10) is located between the outer peripheral surface (60) of the lower end (5) of shaft (6) and the inner peripheral surface (90) of insertion hole (9). In accordance with the illustrated embodiment, intermediate ring (10) has a length (L) which is greater than the inserted length (L1) of the lower end of the shaft which corresponds to the depth (P) of the insertion hole. Thus the upper end (100) of intermediate ring (10) projects outside the insertion hole. It projects externally by a length (1) equal to the difference between its total length (L) and the depth (P) of the corresponding insertion hole (9). Length (1) may be between 10 and 25 mm. The said intermediate ring (10)is a thin metal ring and includes a peripheral wall (101) constructed of e.g. steel or aluminium. A first and a second layer of adhesive are provided in order to ensure that shaft (6) is embedded in and made integral with the head, and more specifically within the connecting part. The first layer of adhesive (13) is located between the outer peripheral surface (102) of the intermediate ring and the inner peripheral surface (90) of the insertion hole. The second layer of adhesive (14) is located between the outer peripheral surface (60) of the lower end (5) of shaft (6) and the inner peripheral surface (103) of ring (10). Of course the first layer of adhesive (13) does not extend over the full length (L) of ring (10) but only along its inserted length (L1), while the second layer (14) may extent over the entire length (L) of said intermediate ring (10). Advantageously a covering ring (15) is provided to cover the upper

projecting part (100) of intermediate ring (10). This ring thus hides the projecting part of the intermediate ring and gives the join a better appearance. This is constructed of e.g. plastics material and includes a peripheral wall (16) peripherally delimiting an axial hole (17) which comprises two portions: a lower portion (170) covering the end of the ring, followed by an upper portion (171) separated from the former by a shoulder (172) and whose diameter is substantially that of the shaft.

The assembly described above allows the shaft to be removed easily. The various stages of the dismantling operation are illustrated in Figures 4 to 7.

Preliminary stage "a" consists of withdrawing covering ring (15), as illustrated in Figure 4. This operation reveals the projecting upper part (100) of intermediate ring (10).

In a principal stage "b" heat is applied using a torch (40) or a heating collar, as shown in Figure 5, the said projecting part of the intermediate ring acting as a thermal conductor as it is of metal. Thus the heat propagates along the length of the said ring, which causes softening or destruction of the adhesive without damage to either the head, or in particular the neck thereof, or the shaft, and in particular the lower part thereof.

Once the adhesive (13,14) has softened sufficiently it loses its adhesive power and it is then possible to withdraw the shaft, as shown in Figures 6 and 7.

Figure 8 is a view similar to Figure 1 illustrating a variant in which the head has no neck. In this embodiment the head includes an insertion hole (9) passing right through the heel of the said head, which is intended to receive the lower part of shaft (6). As in

the previous embodiment the head proper consists of a shell (2) forming an internal cavity (7) filled with a filler material (8) such as polyurethane foam. As before, this variant includes an intermediate ring which acts as a thermal conductor, as a result of which the shaft can easily be removed without damaging the parts as before. To assist comprehension of the figure similar components to those in the first embodiment bear the same reference numbers.

As we already mentioned earlier, both the head and the shaft are made of plastics or composite material in the connecting part, and are e.g. constructed of a stack of woven sheets of carbon and/or aramide fibres impregnated with a thermoplastic or thermohardening resin. The adhesive used to bond the shaft and the ring may be e.g. of the epoxy type.

In the embodiments illustrated and described above the male part consists of the lower part (5) of shaft (6) and the female part of the attachment consists of an insertion hole (9) made directly in the head as shown in Figure 8 or within an integral member such as a neck (4) as shown in Figures 1 to7. In the embodiment illustrated in Figure 9, the insertion is the other way round, namely the male part (51) is integral with the head (1) while the female part (91) comprises the central hole in the lower part of shaft (6). Thus head (1) includes a lateral cylindrical extension (51) forming the male part of the attachment which engages the female part (91) forming the insertion hole consisting of the interior of the end (5) of shaft (6). Of course an intermediate ring (10) is provided and the lower end (100) of this projects outside the insertion hole. As before this ring is located between the inner peripheral surface (90) of female part (91) and the outer peripheral surface (60) of

male part (51).

Figures 10 and 11 illustrate variant embodiments of intermediate ring (10). In the variant in Figure 10 intermediate ring (10) has an embedded length (L1) less than the depth (P) of insertion hole (9). Also the depth to which the ring is inserted is limited by a peripheral shoulder (104). The part of the ring which projects (100) has an internal diameter which is greater than the diameter of the remainder of the said ring in order to form an annular space (106) around shaft (6). It goes without saying that the projecting end of the ring can be covered by a covering ring. It will also be noted that ring (10) includes a lower end wall (105) which acts as a stop for the lower end of the shaft.

Figure 11 is another variant according to which ring (10) is not inserted to the full depth (P) of insertion hole (9) and its projecting end (100) covers the upper part (45) of neck (4) externally.

Figure 12 shows in perspective a variant embodiment of intermediate ring (10) in accordance with which the projecting part (100) which is designed to be heated is incomplete.

If a direct flame is used to heat the intermediate ring, a protective member (30) may be provided as illustrated by the dashed lines in Figure 5, placed at the top of the neck and designed to protect it from the said flame.

Of course the invention is not restricted to the embodiments described and illustrated by way of example, but also includes all equivalent techniques and combinations thereof.

CLAIMS:

1. A golf club having a shaft connected to a head by a joint comprising a male part inserted in a female socket, both male part and socket being defined by composite material or plastics, and an intermediate metal ring interposed between the inner peripheral surface of the socket and the outer peripheral surface of the male part and projecting from the socket.

2. A golf club according to claim 1, wherein the male part consists of the lower end of the shaft, and the female socket is an insertion hole provided in the head.

3. A golf club according to claim 1, wherein the male part is integral with the head, and the female socket comprises an insertion hole provided in the lower end of the shaft.

4. A golf club according to any one of claims 1, 2 or 3, wherein the intermediate ring is made of steel or aluminium.

5. A golf club having a head, a shaft of plastics or composite material with the lower part engaged in an insertion hole formed in the region where the shaft is joined to the head, and an intermediate metal ring interposed between the outer peripheral surface of the lower part of the shaft and the inner peripheral surface of the insertion hole and projecting out of the insertion hole.

6. A golf club according to claim 5, wherein the intermediate ring comprises a peripheral wall having an inner peripheral surface (103) bonded to the outer peripheral surface of the lower part of the shaft by means of a first layer of adhesive and an outer peripheral surface bonded to the inner peripheral surface of the insertion hole by means of a second layer of adhesive.

7. A golf club according to claim 6, wherein the layers of adhesive are adhesives of the epoxy type.

8. A golf club according to any one of claims 2, 5, 6 or 7, wherein the head comprises a neck incorporating the insertion hole.

9. A golf club according to any one of claims 1 to 8, wherein the intermediate ring is thin.

10. A golf club according to claim 9, wherein the intermediate ring has a thickness of approximately 0.5 mm.

11. A golf club according to any one of the foregoing claims, wherein the projecting part of the intermediate ring is covered by a covering ring.

12. A golf club according to claim 11, wherein the covering ring is made of plastics material.

13. A golf club substantially as herein described with reference to the accompanying drawings.

14. A method of removing the shaft of a golf club according to any one of the foregoing claims, the method comprising the steps of heating the projecting part of the intermediate ring to soften or destroy adhesive fixing the intermediate ring in place, heat being conducted along the intermediate ring and withdrawing the shaft after the adhesive has been softened or destroyed.

15. A method according to claim 13, wherein as a preliminary step a covering ring covering the projecting part of the intermediate ring is removed.

16. A method according to claim 14 and substantially as herein described.